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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/963,964	09/26/2001	Chen-Wen Fan	99-2-930	1558

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OSRAM SYLVANIA Inc.
100 Endicott Street
Danvers, MA 01923

EXAMINER
CLEVELAND, MICHAEL B

ART UNIT	PAPER NUMBER
1762	5

DATE MAILED: 07/03/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/963,964	Applicant(s) FAN ET AL.	
	Examiner Michael Cleveland	Art Unit 1762	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 September 2001* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-8* is/are pending in the application.

4a) Of the above claim(s) *6-8* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-5* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *4* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Election/Restrictions

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:

   I. Claims 1-5, drawn to a method of coating phosphors, classified in class 427, subclass 215.

   II. Claims 6-8, drawn to a coating apparatus, classified in class 118, subclass 716.

2. The inventions are distinct, each from the other because of the following reasons:

Inventions I and II are related as process and apparatus for its practice. The inventions are distinct if it can be shown that either: (1) the process as claimed can be practiced by another materially different apparatus or by hand, or (2) the apparatus as claimed can be used to practice another and materially different process. (MPEP § 806.05(e)). In this case the process as claimed may be performed by another and materially different apparatus such as an apparatus comprising a radiant heater above the vessel rather than a heater surrounding the vessel.

3. Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

4. Because these inventions are distinct for the reasons given above and have acquired a separate status in the art because of their recognized divergent subject matter, restriction for examination purposes as indicated is proper.

5. During a telephone conversation with Robert Clark on 6/11/2003 a provisional election was made with traverse to prosecute the invention of Group I, claims 1-5. Affirmation of this election must be made by applicant in replying to this Office action. Claims 6-8 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

6. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Claim Interpretations

7. The term "zinc sulfide-based electroluminescent phosphors" has been interpreted in light of the specification as inclusive of phosphors that include a substantial portion of zinc sulfide, but not excluding the presence of other elements, such as copper or manganese, that activate the phosphor.

There is no explicit link between the phosphors in the claimed process steps, and the zinc sulfide-based phosphor of the preamble. However, because the process steps must be capable of performing the function recited in the preamble, the claims have been treated as requiring that at least some of the particles charged into the reaction vessel must be zinc sulfide-based.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

10. Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sigai (U.S. Patent 4,585,673, hereafter '673) in view of Klinedinst (U.S. Patent 5,080,928, hereafter '928) and Gingerich et al. (U.S. Patent 6,171,650, hereafter '650).

Gingerich '650 has a common inventor with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art only under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 103(a) might be overcome by: (1) a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the

inventor of this application and is thus not an invention "by another"; (2) a showing of a date of invention for the claimed subject matter of the application which corresponds to subject matter disclosed but not claimed in the reference, prior to the effective U.S. filing date of the reference under 37 CFR 1.131; or (3) an oath or declaration under 37 CFR 1.130 stating that the application and reference are currently owned by the same party and that the inventor named in the application is the prior inventor under 35 U.S.C. 104, together with a terminal disclaimer in accordance with 37 CFR 1.321(c). For applications filed on or after November 29, 1999, this rejection might also be overcome by showing that the subject matter of the reference and the claimed invention were, at the time the invention was made, owned by the same person or subject to an obligation of assignment to the same person. See MPEP § 706.02(l)(1) and § 706.02(l)(2).

'673 teaches

A process for preparing particles of electroluminescent phosphors having a protective alumina coating thereon (The coating must inherently provide some degree of moisture resistance merely by posing a physical barrier to moisture; however, see also the discussion of Klinedinst '928 below) comprising the steps of:

selecting a reaction vessel (15) having a given height (See Fig. 1) and a porous disc (14) at the bottom thereof (col. 4, lines 53-68; col. 5, lines 35-38);

charging said reaction vessel with phosphor particles and fluidizing said particles by introducing an inert gas into said vessel through said porous disc (col. 2, line 60-col. 3, line 8; col. 4, lines 62-66);

heating said reaction vessel to a reaction temperature (col. 5, lines 1-3; col. 5, line 66-col. 7, line 9; col. 6, line 56-64);

introducing a coating precursor (e.g., trimethyl aluminum (TMA); see Example 1, col. 6, lines 31-39) into said reaction vessel (col. 5, lines 24-31);

introducing a co-reactant (e.g., oxygen; Example 1, col. 6, lines 39-42) into said reaction vessel through holes (18) which are at a position substantially midway of said given height (See Fig. 1); and

maintaining said inert gas flow, said precursor flow and said co-reactant flow for a time sufficient for a reaction to occur and coat said phosphor with said moisture resistant coating (col. 6, line 65-col. 7, line 14).

'673 does not explicitly teach A) the coating zinc-sulfide based phosphors, or B) that the coating precursor (TMA) is introduced at a position adjacent the bottom of the vessel but above the porous disc.

A) '673 teaches the coating of halophosphate phosphors, but the disclosure is open to use of other phosphors (col. 4, lines 27-30). '928 teaches a similar fluidized bed system (Fig. 1) in which TMA reacts with an oxidizer, such as water, to provide a of zinc sulfide-based phosphor particles with moisture-resistant alumina coatings (Abstract; col. 1, lines 46-64). The method of '673 is known as a suitable method for applying alumina coating to phosphors via the reaction of TMA and an oxidizer, as described above. The selection of something based on its known suitability for its intended use has been held to support a *prima facie* case of obviousness. *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945). See MPEP 2144.07. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used the system of '673 to have provided moisture-resistant alumina coatings to the zinc sulfide phosphors of '928 instead of halophosphate phosphors with a reasonable expectation of success, because '673 teaches a method of providing alumina coatings on a fluidized bed of phosphors by the reaction between TMA and an oxidizing co-reactant and because '928 teaches that zinc-sulfide based phosphors may benefit from an alumina coating applied in a fluidized bed via the reaction between TMA and an oxidizing co-reactant.

B) '673 does not teach that the coating precursor (TMA) is introduced at a position adjacent the bottom of the vessel but above the porous disc. In fact, it teaches that the TMA is introduced through the porous disc (col. 5, lines 4-14). '673 further discusses a method for preventing the reaction products from clogging the pores of the frit (col. 15, lines 15-51), but does not propose the solution of introducing the precursor above the frit. Gingerich '650 teaches a method of coating electroluminescent particles in which the clogging of a porous frit via the reaction of a metal containing precursor (col. 3, lines 26-35) is avoided by introducing the precursor at a position adjacent the bottom of the vessel but above the disk (Fig. 2; col. 3, line 36-col. 4, line 14). Therefore, it would have been obvious to one of ordinary skill in the art at the

time the invention was made to have introduced the metal-containing precursor (TMA) of '673 substantially adjacent to but above the frit instead of through the frit with a reasonable expectation of success and with the expectation of similar results because '673 teaches that the frit should not be clogged by the reaction of the metal precursor, and because '650 teaches that an operative method of avoiding clogging of the frit was by introducing the precursor substantially adjacent to but above the frit. The selection of something based on its known suitability for its intended use has been held to support a *prima facie* case of obviousness. *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945). See MPEP 2144.07.

11. Claims 1-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gingerich '650 in view of Sigai '673. (Applicant's admitted prior art and U.S. Patent 6,064,150 are cited as evidence regarding claim 2.) See comments above that Gingerich '650 has a common inventor with the present application.

'650 teaches

A process for preparing particles of zinc sulfide-based electroluminescent phosphors (col. 2, lines 58-60) having a moisture-resistant aluminum nitride coating thereon (col. 2, lines 11-32) comprising the steps of:

selecting a reaction vessel (10a) having a given height (See Fig. 2) and a porous disc (12a) at the bottom thereof (col. 3, lines 36-col. 4, line 14);

charging said reaction vessel with phosphor particles (col. 2, lines 13-14) and fluidizing said particles by introducing an inert gas into said vessel through said porous disc (col. 4, lines 11-14);

heating said reaction vessel to a reaction temperature (col. 2, line 15; col. 4, lines 1-4);

introducing a coating precursor (hexakis(dimethylamido)dialuminum) into said reaction vessel at a position adjacent said bottom of the vessel but above said disc (Fig 2; col. 3, line 26-col. 4, line 8);

introducing a co-reactant (anhydrous ammonia, col. 4, lines 8-10) into said reaction vessel; and

maintaining said inert gas flow, said precursor flow and said co-reactant flow for a time sufficient for a reaction to occur and coat said phosphor with said moisture resistant coating (col. 2, lines 29-32).

'650 teaches that the ammonia is fed through the porous frit (col. 4, lines 9-11). It does not teach that the ammonia substantially midway of the height of the reactor. '673 teaches a method of providing coatings to fluidized beds of phosphors by reacting a metal-containing coating precursor with a co-reactant. The co-reactant may be introduced through holes (18) in a vibrating shaft that are substantially midway at the height of the reactor (Example 1, col. 6, lines 39-42). The selection of something based on its known suitability for its intended use has been held to support a *prima facie* case of obviousness. *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945). See MPEP 2144.07. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have introduced the co-reactant of '650 substantially in the middle of the height of the reactor with a reasonable expectation of success and with the expectation of similar results because '673 teaches that the middle of the reactor is a suitable introduction point for a co-reactant gas in a fluidized bed process.

Claim 2: '650 does not explicitly teach that the protective coating is aluminum nitride amine. However, Applicant has stated (on p. 2) that '150 teaches coatings of aluminum nitride or aluminum nitride amine. '150 does not use the term "aluminum nitride amine", but the phosphors, precursors (col. 2, lines 32-43) and reaction temperatures (Table I) of '150 are identical to those taught by '650 (col. 3, line 26-col. 4, line 14). Therefore, it appears that the disclosure of '650 must necessarily teach the production of aluminum nitride amines because it discloses the identical precursors and reaction temperatures.

Claims 3-5: '650 teaches a coating precursor of hexakis(dimethylamido)dialuminum (col. 3, lines 26-28), a co-reactant of anhydrous ammonia (col. 4, lines 8-10), and reaction temperatures of 150-225 °C (col. 4, lines 1-3).

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael Cleveland whose telephone number is (703) 308-2331. The examiner can normally be reached on 8-5:30 M-F, with alternate Mondays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shrive Beck can be reached on (703) 308-2333. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 306-3186 for regular communications and (703) 306-3186 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

Michael Cleveland
Patent Examiner
June 27, 2003